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EXAMINER

TYNAN, MATTHEW

ART UNIT	PAPER NUMBER
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2871

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/535,237

Applicant(s)

LIM ET AL.

Examiner

Matthew Tynan

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/17/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 5/17/2005 was filed after the mailing date of the instant application on 5/17/2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

3. Claim 19 is objected to because of the following informalities: in line 8, the word "emit" should be changed to "transmit." Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 3, 4, and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Regarding claims 1, 3, and 4, lines 4 and 7 recite "a first medium having a first reflective index" and "a second medium having a second reflective index." The applicants have further claimed the "first medium having a light guide pathway" and a "second medium being filled in the light guide pathway."

Art Unit: 2871

6. It is not clear from the specification what the applicants mean by a “reflective index,” since it is more common to speak of light guides in terms of a *refractive* index.

7. The applicants have further confused the issue by identifying air as a material having a reflective index of about 1. The examiner knows no meaning of “reflective index” which could encompass light having an index of 1, as air does not generally reflect light. On the other hand, the refractive index of air is approximately 1.

8. However, if the applicants meant “refractive index” and not “reflective index,” then claim 3 cannot produce a working device. Looking at applicant’s Fig. 1, the second medium 420 is filled in the light guide pathway 430. If a first medium 410 has a refraction index larger than that of the second medium, light will not be reflected within the light pathway but will pass into the first medium.

9. Regarding claim 8, the applicants specify the first medium comprises a plurality of fiber optic pipes each having a core that acts as a light guide pathway. However, if this is the case, there cannot be a second medium “filled in the light guide pathway,” as this pathway is already filled by the core material.

10. For the purposes of examination, the examiner will assume the applicants meant “refractive index” and not “reflective index.”

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2871

12. Claims 1-4, 6-8, 10-16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Arkas (WO 02/06865 A2).

13. Regarding claim 1, Arkas discloses the following:

- A first medium (optical fibers, e.g. 60, 70, 80, or e.g. 92, Fig. 9F) having a light guide pathway disposed between a first region and a second region so as to transmit a light from the first region to the second region, the first medium having a first refractive index.
- A second medium being filled in the light guide pathway so as to reflect the light while the light passes through the light guide pathway and to guide the light to the second region, the second medium having a second refractive index.

14. Regarding this second limitation, Fig. 9F shows a hollow optical waveguide. In this case, air would inherently fill the holes of the hollow waveguide.

15. Regarding claim 2, Arkas shows in Figs. 1 and 3 that the centers of adjacent light guide pathways are arranged in a triangular shape. Fig. 8A and 8B show the adjacent light pathways arranged in a rectangular shape (see pg. 10, lines 13-17).

16. Regarding claim 3, Arkas discloses hollow optical waveguides (Fig. 9F, 9G). This structure inherently possesses a first refractive index greater than the second refractive index, since the second medium filled in the light guide pathway would be air.

17. Regarding claim 4, the hollow optical waveguides taught by Arkas would inherently have a second refractive index of about 1, since the second medium filled in the light guide pathway is air.

Art Unit: 2871

18. Regarding claim 7, Arkas discloses the first region is a light processing region and the second region is a display region (153, Fig. 15B)

19. Regarding claim 8, Arkas discloses the first medium comprises a plurality of fiber optic pipes (Fig. 7) each having a core (70) that acts as the light guide pathway and a cladding (71) that surrounds the core, the cladding contacting an adjacent cladding.

20. Regarding claim 10, Arkas discloses the fiber optic pipes are bonded with each other by means of a bonding material (pg. 9, lines 28-29).

21. Regarding claim 11, Arkas discloses the first medium (e.g. 180, Fig. 18) comprises an optical plate having a plurality of light guide pathways (181).

22. Regarding claim 12, Arkas discloses the light guide pathway has a cylindrical shape (pg. 11, line 22), a triangular prism shape (Fig. 2), a rectangular prism shape, or a polygonal prism shape (pg. 11, lines 22-24).

23. Regarding claim 13, Arkas discloses a method of manufacturing an optical sheet comprising:

- Bundling a plurality of fiber optic pipes by contacting outer surfaces of the fiber optic pipes with each other (pg.9, line 31 – pg. 10, line 2).
- Each of the fiber optic pipes having a first length, a first end, and a second end opposite the first end.
- Cutting the bundled fiber optic pipes (pg. 2, lines 12-13) such that the bundled fiber optic pipes have a second length shorter than the first length.

Art Unit: 2871

24. Regarding claim 14, Arkas discloses bundling the fiber optic pipes further comprises coating a bonding material over the contacted outer surface of the fiber optic pipes (pg. 2, lines 25-29).

25. Regarding claim 15, Arkas discloses that bundling the fiber optic pipes comprises disposing the fiber optic pipes such that the axes of the fiber optic pipes are arranged in a triangular shape when viewed on a plane that is substantially perpendicular to the axes (see Fig. 1, 2).

26. Regarding claim 16, Arkas discloses that bundling the fiber optic pipes comprises disposing the fiber optic pipes such that the axes of the fiber optic pipes are arranged in a rectangular shape when viewed on a plane that is substantially perpendicular to the axes (see Fig. 8C).

27. Regarding claim 18, Arkas discloses grinding the first end and a third end formed by cutting the bundled fiber optic pipes (pg. 10, lines 21-22).

28. Claims 1, 2, 5-8, 10, 13-17, 19-22, and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Silverstein et al. (U.S. Patent No: 5,959,711).

29. Regarding claim 1, Silverstein et al. discloses:

- A first medium (14; see also 80, Figs. 8-11) having a light guide pathway (Fig. 2a) disposed between a first region and a second region.
- A second medium (10) being filled in the light guide pathway so as to reflect the light while the light passes through the light guide pathway.

Art Unit: 2871

30. Regarding claim 2, Silverstein et al. discloses the first medium comprises a plurality of light guide pathways, and centers of the light guide pathways adjacent to each other are arranged in a triangular shape or a rectangular shape (see 80, Figs. 8-11; or Fig. 15, e.g.).

31. Regarding claim 5, Silverstein et al. discloses the light guide pathway has a first length longer than $W/\tan(\theta)$ needed to reflect the light incident into the light guide pathway more than once (see Fig. 2a, 2b, 3).

32. Regarding claim 6, Silverstein et al. discloses the first region is a light generating region (60, Fig. 8) and the second region (66) is a light-processing region.

33. Regarding claim 7, Silverstein et al. discloses the first region is a light-processing region (62) and the second region is a display region (66).

34. Regarding claim 8, Silverstein et al. discloses the first medium comprises a plurality of fiber optic pipes, each having a core (10) that acts as a light guide pathway and a cladding (14) that surrounds the core, the cladding contacting an adjacent cladding (see Fig. 14).

35. Regarding claim 10, Silverstein et al. discloses the fiber optic pipes are bonded with each other by means of a bonding material (col. 12, lines 7-9).

36. Regarding claim 13, Silverstein et al. discloses a method of manufacturing an optical sheet comprising:

- Bundling a plurality of fiber optic pipes by contacting outer surfaces of the fiber optic plates with each other (col. 12, lines 7-9), each of the fiber optic pipes having a first length, a first end, and a second end opposite to the first end.
- Cutting the bundled fiber optic pipes such that the bundled fiber optic pipes have a second length shorter than the first length (col. 12, line 9).

Art Unit: 2871

37. Regarding claim 14, Silverstein et al. discloses bundling the fiber optic pipes further comprises coating a bonding material over the contacted outer surface of the fiber optic pipes (col. 12, lines 7-9).

38. Regarding claim 15, Silverstein et al. discloses that bundling the fiber optic pipes comprises disposing the fiber optic pipes such that the axes of the fiber optic pipes are arranged in a triangular shape when viewed on a plane that is substantially perpendicular to the axes (see 78, Figs. 6-11).

39. Regarding claim 16, Silverstein et al. discloses that bundling the fiber optic pipes comprises disposing the fiber optic pipes such that the axes of the fiber optic pipes are arranged in a rectangular shape when viewed on a plane that is substantially perpendicular to the axes (see 78, Figs. 6-11).

40. Regarding claim 17, Silverstein et al. discloses the second length is longer than $W/\tan(\theta)$ that represents a length needed to reflect the light incident into the light guide pathway more than once (see e.g. Fig. 3)

41. Regarding claim 19, Silverstein et al. discloses a display apparatus comprising:

- A backlight unit (60, Figs. 6-11) that generates a light in a first region.
- A display unit (66) disposed in a second region formed in a light guide pathway.
- An optical sheet (80, Fig. 9) the optical sheet including a first medium and second medium, the first medium being disposed on the light guide pathway, the second medium being filled in the light guide pathway.

42. Regarding claim 20, Silverstein et al. discloses the first medium comprises a plurality of fiber optic pipes (col. 12, lines 7-8) each having a core (10, Fig. 2a) that acts as the light guide

Art Unit: 2871

pathway and a cladding (14) that surrounds the core, the cladding contacting an adjacent cladding (col. 12, lines 7-8; see also Fig. 14).

43. Regarding claim 21, Silverstein et al. discloses the first medium comprises an optical plate on which a plurality of light guide pathways is formed (col. 6, lines 58-60).

44. Regarding claim 22, Silverstein et al. discloses the light guide pathway has a cylindrical shape (see e.g. Figs. 1, 2, 13, 14).

45. Regarding claim 24, Silverstein et al. discloses the optical sheet (80) is disposed between the first region and the second region (see Fig. 9).

46. Regarding claim 25, Silverstein et al. discloses the optical sheet (80) is formed in a third region disposed between the first region and the second region (see Fig. 9).

Claim Rejections - 35 USC § 103

47. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

48. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arkas in view of Stark (U.S. Pub. No. 2002/0131734).

49. Arkas has been discussed above regarding claim 8. Regarding claim 9, Arkas is silent regarding the material used for the fiber optic pipe. However, Stark suggests using polymethyl methacrylate (PMMA) or polycarbonate for a fiber optic pipe because they are cheap to produce and flexible ([0003], lines 21-25).

Art Unit: 2871

50. It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the fiber optic pipes taught by Arkas using PMMA or polycarbonate as taught by Stark because these materials are cheap to produce and are flexible.

51. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverstein et al. (U.S. Patent No. 5,959,711) in view of Hamaguchi et al. (U.S. Patent No. 5,631,753). Silverstein et al. has been discussed above regarding claim 19.

52. Regarding claim 23, Silverstein et al. discloses the following:

- A TFT substrate (72, Fig. 6) having a plurality of pixel electrodes (col. 11, lines 65-66), matrix addressing elements (74) being arranged on a first substrate, the pixel electrodes receiving driving power from the matrix addressing elements.
- A color filter substrate (78) having a color filter and a common electrode (col. 12, lines 3-4), the color filter being disposed on a second substrate and facing the pixel electrodes, the common electrode formed over the second substrate.
- A liquid crystal (76) disposed between the matrix addressing substrate and the color filter substrate.
- The light guide pathway is formed corresponding to each of the pixel electrodes.

53. Silverstein et al. further teaches that active-matrix addressing elements facilitate high-resolution/high-contrast operation (col. 2, lines 23-35).

54. Silverstein et al. does not teach that the matrix addressing elements are thin film transistors.

55. However, Hamaguchi et al. teaches thin film transistors (24, Fig. 1) as the addressing elements of an active matrix substrate ("TFT substrate", col. 1, lines 26-48).

Art Unit: 2871

56. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the thin film transistors as the matrix addressing elements taught by Silverstein et al. in order to facilitate high resolution/high-contrast operation.

Conclusion

57. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kijima (U.S. Pub. No. 2002/0122642) discloses a fiber optic face plate for an EL device with many of the claimed features of the instant application. Kida et al. (U.S. Patent No. 5,321,789) teaches alignment of individual light tubes with the pixels to enhance brightness.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Tynan whose telephone number is 571-270-1433. The examiner can normally be reached on Mon-Fri. 7:30-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.




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